

Operating Manual

Pressure Switch DS 6


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The addresses of our distribution partners are listed on our homepage www.bdsensors.com. It is possible to download data sheets, operating manuals, ordering codes and certificates, as well.

1. General information

1.1 Information on the operating manual

This operating manual contains important information on proper usage of the device. Read this operating manual carefully before installing and starting up the pressure measuring device.

Adhere to the safety notes and operating instructions which are given in the operating manual. Additionally applicable regulations regarding occupational safety, accident prevention as well as national installation standards and engineering rules must be complied with!

This operating manual is part of the device, must be kept nearest its location, always accessible to all employees.

This operating manual is copyrighted. The contents of this operating manual reflect the version available at the time of printing. It has been issued to our best knowledge. BD|SENSORS is not liable for any incorrect statements and their effects.

– Technical modifications reserved –

1.2 Symbols used

- ⚠ DANGER! – dangerous situation, which may result in death or serious injuries
- ⚠ WARNING! – potentially dangerous situation, which may result in death or serious injuries
- ⚠ CAUTION! – potentially dangerous situation, which may result in minor injuries
- ! CAUTION! – potentially dangerous situation, which may result in physical damage
- 📖 NOTE – tips and information to ensure a failure-free operation

1.3 Target group

- ⚠ WARNING! To avoid operator hazards and damages of the device, the following instructions have to be worked out by qualified technical personnel.

1.4 Limitation of liability

By non-observance of the operating manual, inappropriate use, modification or damage, no liability is assumed and warranty claims will be excluded.

1.5 Intended use

- The electronic pressure switch DS 6 has been designed for universal use. Preferred areas of use are, among others, machine building industry, hydraulics, measurement, and controls. Media wetted materials are stainless steel for the pressure port, ceramics Al₂O₃ for the pressure sensor, and FKM or EPDM for the seals. These materials have been chosen particularly in order to achieve high media compatibility even in standard version. The new microcontroller switching electronics offer – besides the standard functions – many additional features for an optimal adaptation to the measuring requirements. The one or two freely programmable contacts whose status is indicated by differently coloured LEDs can be quickly and comfortably configured either by means of the optionally available configuration kits CIS 685 or CIS 686 or the programming device P6.

- It is the operator's responsibility to check and verify the suitability of the device for the intended application. If any doubts remain, please contact our sales department in order to ensure proper usage. BD|SENSORS is not liable for any incorrect selections and their effects!

- It has to be ensured, that this medium is compatible with the media wetted parts.

- The technical data listed in the current data sheet are engaging. If the data sheet is not available, please order or download it from our homepage. (<http://www.bdsensors.com>)

- ⚠ WARNING! – Danger through improper usage!

1.6 Package contents

Please verify that all listed parts are undamaged included in the delivery and check for consistency specified in your order:

- pressure switch DS 6
- mounting instructions

2. Product identification

The device can be identified by its manufacturing label. It provides the most important data. By the ordering code the product can be clearly identified.

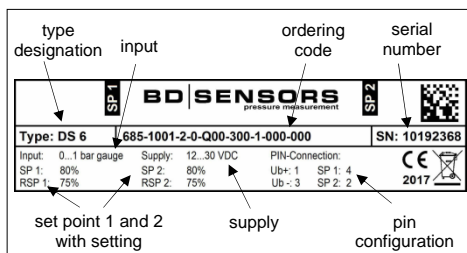


Fig.1 manufacturing label

- ! The manufacturing label must not be removed from the device!

3. Mechanical installation

3.1 General mounting and safety instructions

- ⚠ WARNING! Install the device only when depressurized and currentless!

- ⚠ WARNING! This device may only be installed by qualified technical personnel who has read and understood the operating manual!

- ! Handle this high-sensitive electronic precision measuring device with care, both in packed and unpacked condition!

- ! There are no modifications/changes to be made on the device.

- ! Do not throw the package/device!

- ! To avoid damaging the diaphragm, remove packaging and protective cap directly before starting assembly. The delivered protective cap has to be stored!

- ! Place the protective cap on the pressure port again immediately after disassembling.

- ! Handle the unprotected diaphragm very carefully - it is very sensitive and may be easily damaged.

- ! Do not use any force when installing the device to prevent damage of the device and the plant!

- ! For installations outdoor and in damp areas following these instructions:

- To prevent moisture admission in the plug the device should be installed electrically after mounting, at once. Otherwise a moisture admission has to be blocked e.g. by using a suitable protection cap. (The ingress protection in the data sheet is valid for the connected device.)

- Choose an assembly position, which allows the flow-off of splashed water and condensation. Avoid permanent fluid at sealing surfaces!

- Install the device in such a way that it is protected from direct solar irradiation. Direct solar irradiation can lead to the permissible operating temperature being overstepped in the worst case. By this the operability of the device can be affected or damaged. If the internal pressure increases due to solar irradiation, measurement errors may be caused.

- 📖 In hydraulic systems, position the device in such a way that the pressure port points upward (ventilation).

- 📖 Provide a cooling line when using the device in steam piping.

- 📖 Take note that no inadmissibly high mechanical stresses occur at the pressure port as a result of the installation, since this may cause a shifting of the characteristic curve or to the damage.

- 📖 If there is any danger of damage by lightning or overpressure when the device is installed outdoor, we suggest putting a sufficiently dimensioned overpressure protection between the supply or switch cabinet and the device.

3.2 Mounting and safety instructions oxygen

- ⚠ DANGER! Explosion hazard, with devices for oxygen applications, when used improperly. To ensure a usage without danger, the following points must be adhered to:

- Make sure, your device has been ordered and delivered as a special version for oxygen applications. You can check the manufacturing label (see figure 1). If the ordering code ends with "007", then the device is suitable for oxygen applications.

- At time of delivery the device is packed into a plastic bag in order to prevent it from impurity. Please observe the indication label "Device for oxygen, unpack only directly before assembling". Also, avoid any skin contacts during unpacking and assembly, in order to prevent greasy residues on the device.

- During installation, the respective explosion protection regulations have to be met. Check, if ATEX-approval is necessary for this type (oxygen) device. (the delivered device has no ATEX-approval)

- Note the entire design requirements meet the standard demand of BAM (DIN 19247).

- Transmitters with o-rings of FKM Vi 567: permissible maximum values: 25 bar / 150° C (BAM approval)

3.3 Installation steps

- Carefully remove the pressure measuring device from the package and dispose of the package properly.

- Check to ensure that the O-ring fits properly into the groove (seal is supplied with device).

- Ensure that the surface on which the seal should be placed is perfectly smooth and clean.

- Screw the pressure switch by hand into the thread and tighten it with a wrench (torque approx. 5 Nm).

- **The indicated tightening torques must not be exceeded!**

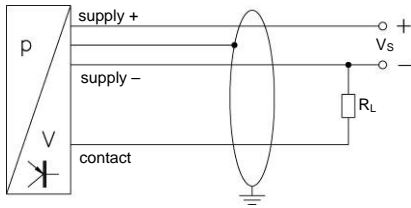
4. Electrical Installation

WARNING! Install the device in currentless environments only!

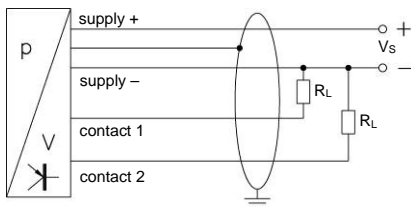
Establish the electrical connection of the device according to the technical data shown on the manufacturing label, the following table and the respective wiring diagram.

Wiring diagrams:

1 contact



2 contacts



Pin configuration:

Electrical connection	M12x1 (4-pin), metal	M8x1 (4-pin), metal
Supply +	1	1
Supply -	3	3
Contact 1	4	4
Contact 2	2	2
Shield	plug housing	plug housing

For the electrical connection a shielded and twisted multicore cable is recommended.

5. Initial start-up

WARNING! Before start-up, the user has to check for proper installation and for any visible defects.

WARNING! The device can be started and operated by authorized personnel only, who have read and understood the operating manual!

WARNING! The device has to be used within the technical specifications, only (compare the data in the data sheet)!

6. Operation

Set point adjustment – factory set

The set points are factory set either to ordered values or to BD|SENSORS standard:

Switching function	n/o (normally opened)
Switching mode	hysteresis mode
Switch on point	80 % FSO
Switch off point	75 % FSO
Switch on/switch off delay	off

Set point adjustment – user specific

Every DS 6 can be quickly and comfortably configured either by means of the optionally available configuration kits CIS 685 or CIS 686 as well as the programming device P6. These devices can be ordered as accessories from BD SENSORS. In the following, a short description of these possibilities is given:

Configuration via configuration kit

The DS 6 can be connected to a PC via the programming adapter and configured by the programming-software P-Set. The setting of the following parameters for both set points is possible:

- operation mode (hysteresis or window mode)
- switch-on and switch-off point
- set point negation
- switch on and switch off delay

The programming adapter is part of the programming kits CIS 685 and CIS 686 which contains i.a. a CD-ROM with the configuration software P-Set. All cables required for connecting the pressure switch have to be plugged to the programming adapter (included in scope of delivery). The user only requires a Windows® PC with serial interface (CIS 685) or USB-interface (CIS 686). Installing the configuration software P-Set is very easy. P-Set runs on all Windows® PC's (95, 98, ME, 2000, NT, XP, Win7).



Fig. 2 programming software



Fig. 3 programming adapter

Configuration via programming device P6

The programming device P6 is simply plugged between DS 6 and the female connector. Via two push-buttons and a 4-digit LED display, all possible settings can be realized. The menu system of the device includes 27 menus and is easy to handle. The following menus are – among others – available for configuration:

- read all and store all
- operation mode
- switch-on and switch-off point
- set point negation
- switch on and switch off delay
- teach switch-on and switch-off point
- load of stored configurations
- storage off current configurations
- showing the current pressure value
- showing the limits of the measuring range



Fig. 4 programming device P6

7. Maintenance

In principle, this device is maintenance-free. If desired, the housing of the device can be cleaned when switched off using a damp cloth and non-aggressive cleaning solutions.

With certain media, however, the diaphragm may be polluted or coated with deposit. It is recommended to define corresponding service intervals for control. After placing the device out of service correctly, the diaphragm can usually be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge. If the diaphragm is calcified, it is recommended to send the device to BD|SENSORS for decalcification. Please read therefore the chapter "Service/repair" below.

- ! An incorrect cleaning can cause irreparable damages on diaphragm. Never use spiky objects or pressured air for cleaning the diaphragm.

8. Troubleshooting

In case of malfunction, it must be checked whether the device has been correctly installed mechanically and electrically. Use the following table to analyse the cause and resolve the malfunction, if possible.

- ! Improper action and opening can damage the device. Furthermore, dangers may arise for the operator. Therefore repairs on the device may only be executed by the manufacturer!

Fault: no output signal although LEDs are working	
Possible cause	Fault detection / remedy
line break	inspect all connecting lines of the contacts (including the connecting plugs)

Fault: no output signal and LEDs are not working	
Possible cause	Fault detection / remedy
wrong setting of the set points	verify that all switch parameters are useful and permitted (e.g. the set parameters must lie within the applied pressure range)

Fault: device does not respond to pressure change	
Possible cause	Fault detection / remedy
defective sensor	please send the device for inspection to BD SENSORS

Fault: little shift of the output signal	
Possible cause	Fault detection / remedy
diaphragm is calcified or crusted	if suspected, please send the device to BD SENSORS for cleaning, if possible

Fault: large shift of the output signal	
Possible cause	Fault detection / remedy
diaphragm is damaged	if a damage (e.g. by over-pressure) is suspected, please send the device BD SENSORS for repair

9. Placing out of service

WARNING! When dismantling the device, it must always be done in the depressurized and currentless condition! Check also if the medium has to be drained off before dismantling!

WARNING! Depending on the medium, it may cause danger for the user. Comply therefore with adequate precautions for purification.

10. Service / repair

Information on service / repair:

- www.bdsensors.com
- info@bdsensors.de
- Service phone: +49 (0) 92 35 98 11 0

10.1 Recalibration

During the life-time of a transmitter, the value of offset and span may shift. As a consequence, a deviating signal value in reference to the nominal pressure range starting point or end point may be transmitted. If one of these two phenomena occurs after prolonged use, a recalibration is recommended to ensure furthermore high accuracy.

10.2 Return

Before every return of your device, whether for recalibration, decalcification, modifications or repair, it has to be cleaned carefully and packed shatter-proofed. You have to enclose a notice of return with detailed defect description when sending the device. If your device came in contact with harmful substances, a declaration of decontamination is additionally required.

Appropriate forms can be downloaded from our homepage. Download these by accessing www.bdsensors.com or request them:

info@bdsensors.de | phone: +49 (0) 92 35 / 98 11 0

In case of doubt regarding the fluid used, devices without a declaration of decontamination will only be examined after receipt of an appropriate declaration!

WARNING! If the device came in contact with hazardous substances, certain precautions have to be complied with for purification!

11. Disposal

The device must be disposed of according to the European Directive 2012/19/EU (waste electrical and electronic equipment). Waste equipment must not be disposed of in household waste!



WARNING! Depending on the measuring medium, deposit on the device may cause danger for the user and the environment. Comply with adequate precautions for purification and dispose of it properly.

12. Warranty Terms

The warranty terms are subject to the legal warranty period of 24 months, valid from the date of delivery. If the device is used improperly, modified or damaged, we will rule out any warranty claim. A damaged diaphragm will not be accepted as a warranty case. Likewise, there shall be no entitlement to services or parts provided under warranty if the defects have arisen due to normal wear and tear.

13. EU Declaration of conformity / CE

The delivered device fulfils all legal requirements. The applied directives, harmonised standards and documents are listed in the EC declaration of conformity, which is available online at: <http://www.bdsensors.com>. Additionally, the operational safety is confirmed by the CE sign on the manufacturing label.